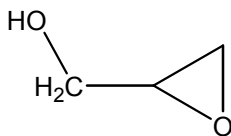


**GLYCIDOL**  
**CAS No. 556-52-5**

First Listed in the *Seventh Annual Report on Carcinogens*



## CARCINOGENICITY

Glycidol is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (NTP 374, 1990). Two-year studies were conducted on mice and rats that were administered glycidol by gavage. Male rats showed increased incidences of mesotheliomas of the tunica vaginalis; fibroadenomas of the mammary gland; gliomas of the brain; and neoplasms of the forestomach, intestine, skin, zymbal gland, and thyroid gland. Female rats had increased incidences of fibroadenomas and adenocarcinomas of the mammary gland; gliomas of the brain; neoplasms of the oral mucosa, forestomach, clitoral gland, and thyroid gland; and leukemia. Male B6C3F1 mice had increased incidences of neoplasms of the harderian gland, forestomach, skin, liver, and lung. Female B6C3F1 mice had increased incidences of neoplasms of the harderian gland, mammary gland, uterus, subcutaneous tissue, and skin. Other neoplasms that may be related to the administration of glycidol were fibrosarcomas of the glandular stomach in female rats and carcinomas of the urinary bladder and sarcomas of the epididymis in male mice (NTP 374, 1990).

There is no adequate data available to evaluate the carcinogenicity of glycidol in humans.

## PROPERTIES

Glycidol, C<sub>3</sub>H<sub>6</sub>O<sub>2</sub>, is a viscous, colorless liquid that boils at 166°C. It is soluble in water and in organic solvents. At 25°C, the vapor pressure is 0.9 mm mercury (NTP 374, 1990). Glycidol is combustible with a flash point of 72 °C (162 °F) (Radian, 1991).

## USE

Glycidol is used as a stabilizer in the manufacture of vinyl polymers, and as an intermediate in the synthesis of glycerol, glycidyl ethers, and amines. Glycidol is also used as an additive for oil and synthetic hydraulic fluids, as a diluent in some epoxy resins, and as a dye-leveling agent. It is used in surface coatings, chemical synthesis, pharmaceuticals, sanitary chemicals and sterilizing milk of magnesia (Radian, 1991). The glycidol structure is present in two commercially important groups of derivatives, glycidyl ethers and glycidyl esters, neither of which is prepared directly from glycidol. Glycidyl ethers are prepared on a commercial scale in a closed system. The end product is a mixed ether, one component of which is the glycidyl group. Glycidyl esters are prepared by reacting the sodium salt of the appropriate carboxylic acid with epichlorohydrin. Both types of derivatives are used almost exclusively as diluents in epoxy resins (NTP 374, 1990). Glycidol also falls into the generalized category of chiral epoxides. These chiral epoxides or glycidols can be used as reagents in a number of

pharmaceutical and fine chemical applications. They include pesticides and herbicides, flavors and fragrances, chiral polymers, and liquid crystals (ARCO, 1990).

## **PRODUCTION**

The SRI identified one domestic producer of glycidol, but no production volumes were reported (SRI, 1997). Over 10 million lb of glycidyl compounds are produced or imported into the United States annually (NTP 374, 1990).

## **EXPOSURE**

The primary routes of potential human exposure to glycidol are inhalation, eye and dermal contact, and ingestion. Occupational exposure may occur through inhalation. The National Occupational Exposure Survey conducted by NIOSH from 1980 to 1983 estimated that in 88 facilities, covering 10 occupations, 4,871 workers, including 579 women, were potentially exposed to glycidol (NIOSH, 1984). This estimate was derived from observations of the actual use of the compound (78% of total observations) and the use of trade name products known to contain the compound. Glycidol is moderately irritating to the skin and mucous membranes; however, if absorbed through the skin, it can cause central nervous system stimulation followed by depression (Merck, 1989). If the chemical comes into contact with someone's eyes or skin, they should flush them immediately. If the chemical is inhaled, the exposed person should be moved to fresh air at once and artificial respiration should be performed if necessary. If the chemical is ingested, large quantities of water should be given to the person and vomiting should be induced. If the chemical is spilled in the work area, it should be washed away with large volumes of water.

## **REGULATIONS**

EPA regulates glycidol under the Toxic Substances and Control Act (TSCA). OSHA final rule regulates the permissible exposure limit (PEL) to 50 ppm (150 mg/m<sup>3</sup>), and 8-hr time-weighted average (TWA) to 25 ppm (75 mg/m<sup>3</sup>) for glycidol. OSHA regulates glycidol under the Hazard Communication Standard and as a chemical hazard in laboratories. The American Conference of Governmental Industrial Hygienists (ACGIH) has proposed to change the TWA for glycidol to 2 ppm (6.1 mg/m<sup>3</sup>) (HSDB, 1998). Regulations are summarized in Volume II, Table B-68.